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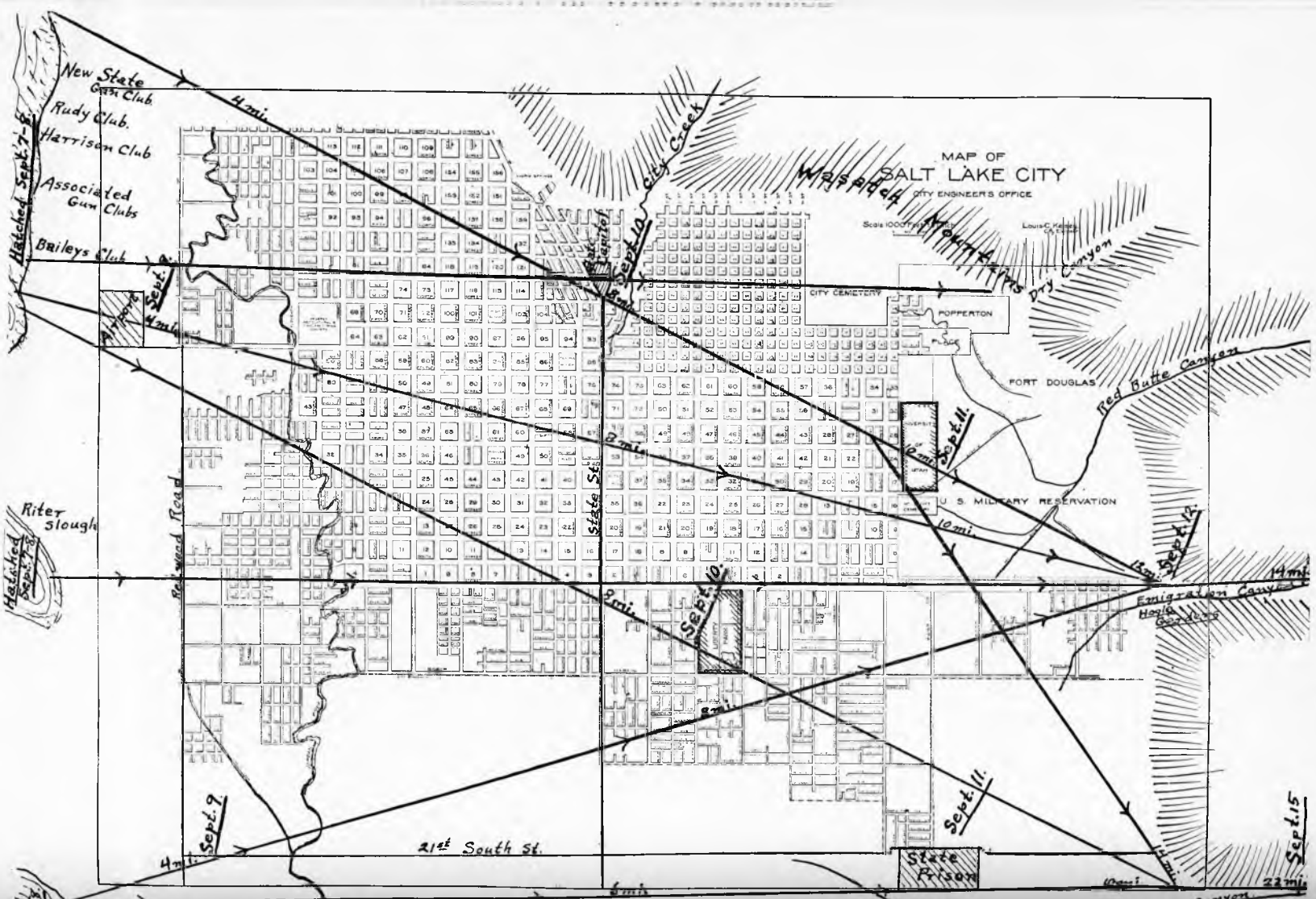

Appearance of mosquito (Aedes dorsalis Meigen) in Salt Lake City, September 19[illegible]

Observations on a Mosquito Flight in Salt Lake City

By Don M. Rees

In a survey of the mosquitoes of Salt Lake City carried on since 1929, a number of mosquito flights have been observed and recorded. These flights have occured principally in three species of mosquitoes common to region,—*Aedes campestris* Dyar and Knab *Aedes vexans* (Meigen) and *Aedes dorsalis* (Meigen). These mosquitoes appear in large broods when conditions are favorable and their flights have been definitely traced for several miles on different occasions. *Aedes campestris* appear in greater numbers during May and June and some of this species have been taken during the season ten miles from their nearest breeding area. *Aedes vexans* are more numerous during June, July and August. The flight of this mosquito has been traced from five to eight miles from its nearest breeding water. Undoubtedly many of the adults taken flew a greater distance than the maximum flight we were able to determine. We have observed during the past four years a number of flights of *Aedes dorsalis*, but during September 1932, we were able to record a flight with conditions such that the facts could be ascertained with far greater certainty than usual.

An explanation of the characteristics peculiar to the region near Salt Lake City is necessary in order to understand the method used in determining the flight of mosquitoes. Salt Lake City stands at an elevation of about 4400 ft. It is situated in a pocket of the Wasatch Mountain range with mountains rising to an elevation of seven to ten thousand feet on the north and east. On the south is bench land with no extensive mosquito breeding areas of *Aedes dorsalis* in that direction. The mountains as a barrier and the lack of suitable breeding areas for the species mentioned prevents an invasion of these mosquitoes from the north and east. Extending west from Salt Lake City about fifteen miles to the shores of the Great Salt Lake is a level expanse of country part of it under cultivation and irrigation and part of it waste land consisting of alkali and salt flats. Large tracts of this land owned by gun clubs are constantly under water. Other extensive areas are covered with salt grass, and are periodically flooded by the gun clubs and other property owners when water is available. The natural water channels are kept comparatively free from developing mosquito larvae by small minnows—*Leuciscus timpanogensis* (Cope)* and other natural enemies of mosquito larvae, but when by the use of

dykes and canals the high waters are diverted from their natural channels and hundreds of acres of salt grass temporarily flooded immense broods of *Aedes dorsalis* develop and their flight through the City can readily be observed. Whether these flights are migrations in a definite direction or a dispersal radiating out in all directions from the breeding area has not been fully determined, but from the records obtained from some of these flights it seems that the majority of the mosquitoes hatched in a given area, travel in the same general direction.

In August, 1932, from the 26th to the 29th of the month, 2.60 inches of rain fell in the vicinity of Salt Lake City. The normal rainfall for the month of August is .85 of an inch. This excessive precipitation caused abnormal flooding west of the City. Many depressions previously dry were filled with rain water and the farmers having no need for irrigation water allowed this water to flow through their canals, drains and the Jordan River towards the Lake. Thus early in the season the gun clubs finding water available used it to flood their high shooting grounds previously dry. The high water soon receded in the canals and the river but the water that was forced into salt grass depressions on high ground and the rain filled pools remained, and an immense brood of *Aedes dorsalis* was produced almost simultaneously over a large area.

The Salt Lake City Mosquito Abatement District has under control an area of about 110 square miles comprising the City proper, to the mountains on the north and east, and a strip of country ranging from three to four miles wide on the south and west. This strip is outside the residential district of the City. In the area under control permanent drains are being constructed as rapidly as possible but approximately 1,000 pools of varying size must still be inspected and treated when necessary. Most of these pools are created by irrigation water, occasionally they are filled by natural precipitation. These pools are inspected once each week and treated as often as necessary to prevent mosquitoes from developing.

Immediately after the heavy rain in August greater precautions were taken in the control area to examine all possible breeding places and additional men were used on the oiling crews so that no broods of mosquitoes escaped in the controlled area. On the flooded flats west of the City, however, a large brood of *Aedes dorsalis* developed and for some unknown reason began to move out in all directions, but the greater numbers moved eastward towards Salt Lake City.

The first adults hatched on September 7th, just twelve days after the flooding began. On September 8th men working in the fields and near the gun clubs had to abandon their work, mosquitoes were present

in swarms, horses became unmanageable and other livestock were driven to shelter. On September 9th, these mosquitoes arrived at the City Airport a distance of about four miles from where they were hatched. They were also found several miles north and south of Airport, at North Point and 21st South and Redwood Road, each point about three to four miles from the breeding waters. On September 10th, at 7:00 a. m. these mosquitoes appeared in the center of the City, they had moved in during the night, the total distance being seven or eight miles from where they were hatched. Specimens were taken at the State Capitol, City and County Building, Liberty Park and other places throughout the City, but none were taken at the University of Utah or on the Bench east of the City. On Sunday morning September 11th at 8:00 a. m. they were found at the University of Utah, Bonneville and Fort Douglas Golf Courses, showing a total flight of from ten to eleven miles. Monday morning at Hogle Gardens a distance of twelve miles from the beginning of the breeding grounds, no *dorsalis* were found, but just after sun-down they arrived. On the bench just west of Hogle Gardens great numbers of *Aedes dorsalis* were observed in flight. A very slight breeze was blowing towards the west but the mosquitoes were moving towards the east. The majority seemed to be females but some males were also taken. In other observed flights of this same species some males were also taken along with the females. On September 13th at 10:00 a. m. mosquitoes were numerous at Hogle Gardens and some were taken 2 miles up Emigration Canyon, which is directly east of Hogle Gardens. Collections at later dates failed to indicate flight up this canyon farther than 2 miles. This record shows a maximum flight of about fourteen miles in this locality.

The great majority of the mosquitoes upon reaching the base of the mountains continued their journey along the old Bonneville Lake terrace towards the south, but their flight could not be definitely traced from this point southward as mosquitoes entered this region from the flats directly west. Mosquitoes were found in great numbers all along the base of the mountains as far as 59th south. The numbers gradually decreased from the base towards the summit of the mountain. The continued flight towards the east occuring only in the various canyons.

Mosquitoes from this flight were also taken up other canyons, the farthest flight was recorded in Parley's Canyon, the canyon south of Emigration Canyon. They were first taken at Mountain Dell Reservoir about six miles up Parley's canyon on September 15th. The watchman at this reservoir informed us that there had been no gray mosquitoes present prior to this date. They were quite numerous and very annoying. No males were taken and no mosquitoes were taken

above the reservoir on this date. On September 17th, *Aedes dorsalis* were again collected at Mountain Dell Reservoir and a few were taken above the reservoir. They decreased in numbers above the reservoir the last one was taken 2 miles above, at an elevation of about 7500 ft. None so far as could be determined reached the summit of the mountains. Thus we were able to record a maximum flight of 22 miles.

This invasion of mosquitoes into Salt Lake City was the most serious experienced for several years. They passed through every part of the City, even the business section. When possible they entered houses and offices and annoyed people on the streets. They were most active about sun down but would bite at any time of the day or night. They were active voracious feeders and were very troublesome while they remained. They were present in a section for a week or ten days from the time they appeared, being usually most numerous from the second to the fourth day after their appearance.

On September 12, just five days after hatching, the mosquitoes were greatly reduced in number on areas where they were hatched. On September 13th, the number of mosquitoes found in the breeding area was about normal. September 14th conditions were normal at Airport and North Point and on September 15th no mosquitoes were found in the business section of the City. A few still remained at the State Capitol grounds and Liberty Park. By the 18th mosquitoes were practically gone from the City and the numbers were greatly reduced on the Golf Courses east of the City and along the base of the mountains. Collections showed a gradual decrease each day after they began to disappear.

In observing the flight, records were made from general observations, hand collections, and a light trap identical with the light traps used by Dr. Thos. J. Headlee of the New Jersey Agricultural Experiment Station. The general observations were compiled from field notes taken from reports handed in each evening by Inspectors and employees of the Salt Lake City Mosquito Abatement District on special forms provided for the purpose. The hand collections were taken at random at different intervals and at designated times at certain stations. The Light Trap was run at the same station on the Fort Douglas Reservation east of the City.

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*Identification by Dr. Samuel F. Hildebrand, Senior Ichthyologist, U. S. Bureau of Fisheries.